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# THE BRYOLOGIST.

VOL. XII

JANUARY 1909

No. 1

## LICHEN NOTES No. 7.

### *Cladonia multiformis* (nom. nov.) Bry. 6: 1908.

G. K. MERRILL.

#### EXPLANATION OF PLATE I. CLADONIA MULTIFORMIS.

All the above specimens here illustrated were collected in South Thomaston, Maine, within a limited area. An attempt has been made to show in sequence the stages of development between the scyphiform juvenile plant, and maturer conditions ultimately branched. No. 1 illustrates simple podetia without proliferations; Nos. 2, 3, 4 and 5 show both simple and proliferating conditions, and No. 6 cups in two ranks. The remaining numbers, excluding 22, are from specimens showing the beginnings of, and progressively the extent and mode of ramification in branched states. All of these latter show the cups more or less perfectly, and make plain that the species is unquestionably scyphiform. No. 22 illustrates fissured and gaping podetia.

#### EXPLANATION OF PLATE II. CLADONIA MULTIFORMIS.

No. 1. illustrates a specimen of *C. furcata* var. *Finkii* Wain. received from Dr. Bruce Fink. The cups are not well shown, and the plant is more foliose than any in Pl. I., but there can be no question of its being identical. No. 2 is a short robust state remarkable for being corticated exactly as in *C. gracilis* var. *dilatata* and with its scyphi similar in shape. No. 3 is a well developed exclusively scyphiform condition determined by one authority as *C. furcata* var. *paradoxa* Wain., but the identification afterward amended when called a "scyphiform *C. furcata*." No. 4 coming to the writer labelled as *C. furcata* v. *paradoxa* Wain., is an unaccountable opinion. It is comparable with No. 21 of Pl. I. and No. 6 of the present. No. 5 was determined by an Old World student as *C. furcata* v. *paradoxa* Wain. but afterward amended in the same manner as No. 3; it is comparable with Nos. 4 and 6 of Pl. I. No. 6 is a well developed plant from central Maine attaining to 8 cent. in height, marked as *C. furcata* a. *crispata* by an American authority. No. 7 was determined for the writer as *C. crispata* v. *infundibulifera*, with the remark "cups very large," and No. 8 an exactly similar plant was identified by the same person as *C. furcata* v. *Finkii* with the remark "nearer to this than *racemosa*." All reduced  $\frac{1}{2}$ .

The plates accompanying this paper provide a fairly complete pictorial view of a well known but little understood American *Cladonia* form. Associated by Tuckerman with *Cladonia furcata* (Huds.) Fr., it is in part described under var. a. *crispata* Flk. in his Synopsis Pt. I, p. 247. American students have apparently found no difficulty in making Tuckerman's description of a. *crispata* fit such examples of *C. multiformis* as were brought to

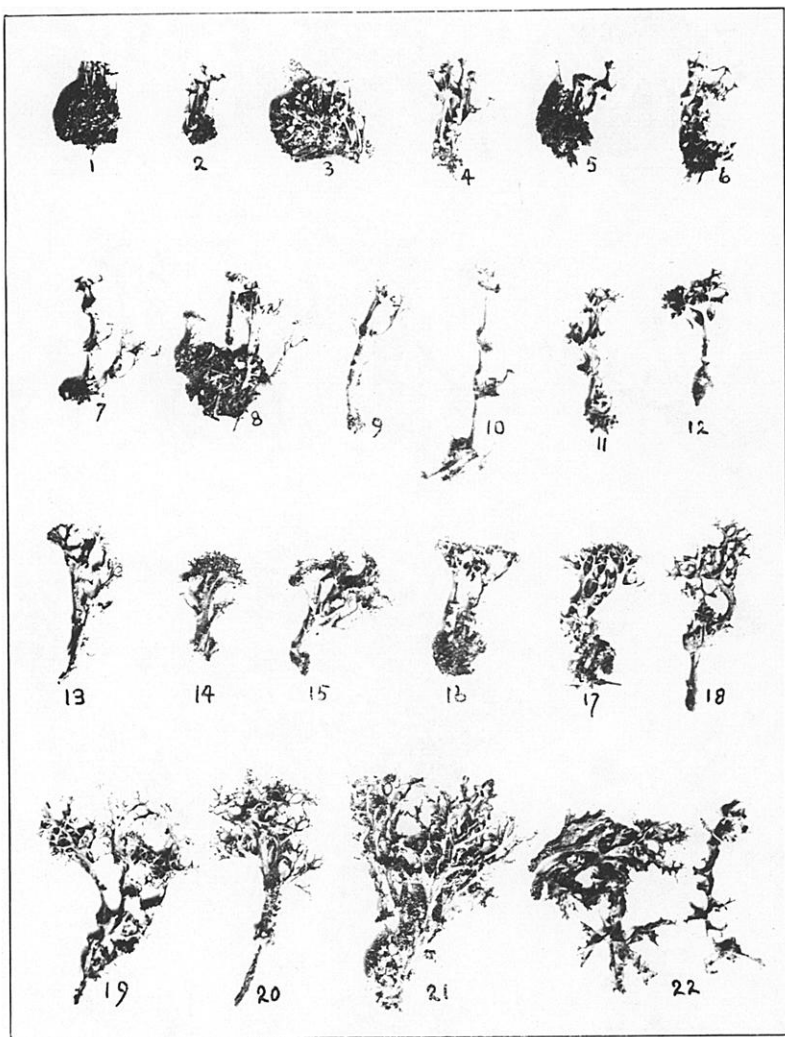


PLATE I. *Cladonia multiformis*.  
All reduced one-third.

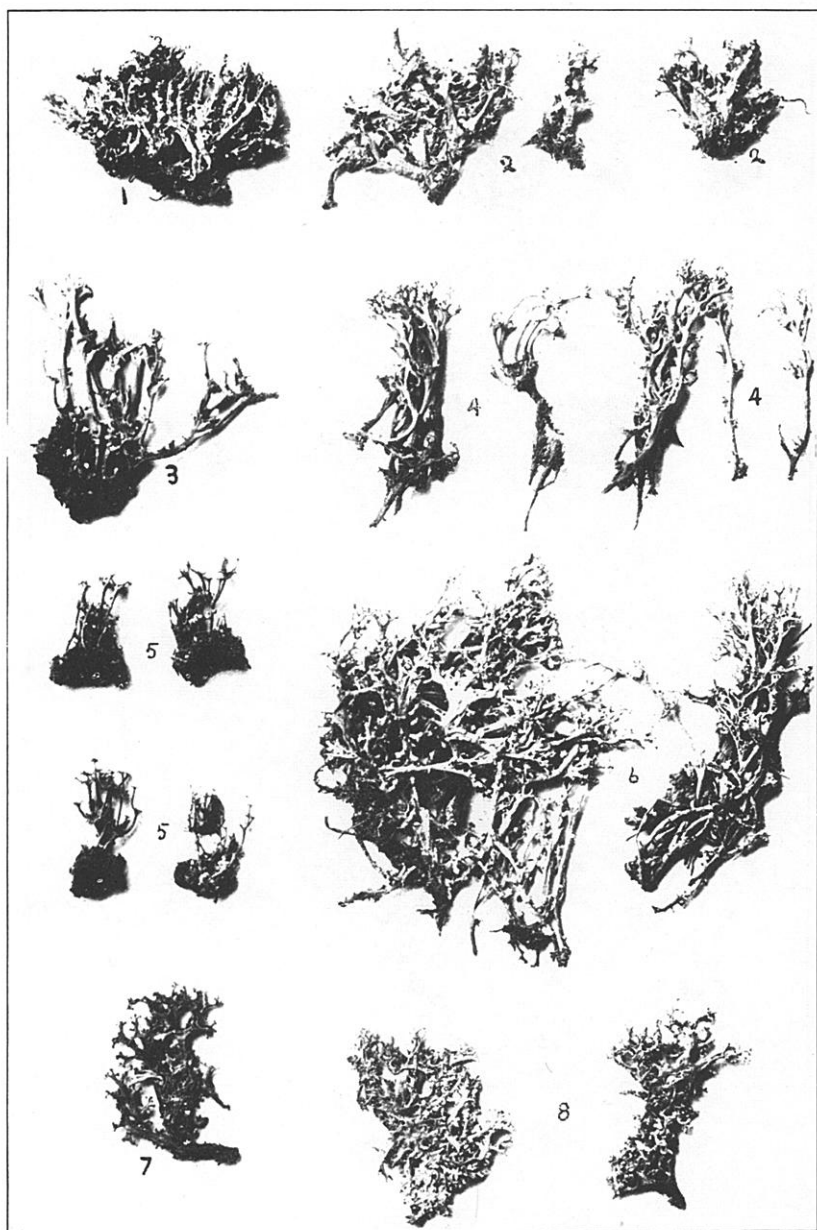


PLATE II. *Cladonia multiformis*.  
All reduced one-third.

their notice, and to have been unassailed by doubts regarding the accuracy of their reference, or the status of the form itself. The first to challenge equivalency for the plant with *a. crispata*—or *C. crispata* (Ach.) Fl. as now reckoned, seems to have been Wainio. From material sent to him by Dr. Fink, he indicated the form as a new variety *Finkii* Wain. of *C. furcata*. The evidence that *C. furcata Finkii* Wain. is identical with the plant here defined, is furnished by Dr. Fink's brief description in BRYOLOGIST VII, no. 4, p. 55, examination of specimens of *v. Finkii* communicated to, and determined for the writer by Dr. Fink, and of others identified for Mrs. C. W. Harris. Study of the large series of *C. multiformis* contained in our herbarium prompts a doubt of the validity of this proposed association with *C. furcata*, and brings conviction that the plant however near it may be to other forms, is yet specifically distinct. The comparatively meagre material that the writer has been enabled to transmit to European students has proved puzzling, and no definite place has been fixed by them for the plant, except a tentative concurrence with Wainio's opinion. The most obvious point of resemblance between *C. multiformis* and *C. furcata*, and the one which it is assumed suggested the relationship to Wainio, is only to be noted in such individuals of the first named as are conditioned in that cristate-ramulose manner of which the divisions are more or less fissured and flattened, as in the summits of *C. furcata racemosa corymbosa* Nyl. (sensu Wainio). Now while this resemblance is in a manner confirmatory of such a view, the failure of *C. furcata* in its racemose variations to furnish scyphiform exhibitions even recedently, presents as yet an unbridged gap in phylogentic record. It is true that there are states of *C. multiformis* ultimately resembling certain forms of *C. furcata*, but curiously enough, both must attain a degree of maturity before this is apparant. In no instance so far as our observation extends, is there any similarity between juvenile forms. *C. furcata* is primarily and constantly ascyphiferous, while *C. multiformis* is initially cup-bearing and does not develop ramuli until a scyphus has been formed. Proliferations from this may be, and often are, simple like the basal section of the podetia and terminating in a cup, or at once become branched. Instances have been noted of one proliferation from the first scyphus continuing until five to seven ranks were attained, all cup-bearing, while another becomes branched and cristate. If the species is a hybrid, it may safely be asserted that the fusion is not anterior to the development of the scyphus, and thus that phenomena of the partnership which produces a counterpart of the habit of *C. furcata corymbosa* is in another aspect lessened in importance as a guide to affinity or specific rank. On the evidence afforded by the specimens examined, it seems probable that while the branching summits of the species apparently mark the ultimate of development, this is only true in particular cases, for some individuals never develop ramifications. And again some aspects of *C. multiformis*, as before noted present a dual phase of development, in the curiously inconsistent conditions of a fruticulose combined in one individual with a scyphiferous type; but this while remarkable is not without analogy in *Cladonia*. The point to be clearly noted is, that of the two modes of proliferation, one scyphiform throughout its development,

and the other dendritic and never provided with cups, the latter must be considered the atypical as it is known to be the inconstant phase of growth. As no observation has yet conclusively established *C. furcata*, its var. *racemosa*, or its modification *corymbosa* to be an ascyphiferous evolution of *C. multiformis* or any other cup-bearing Cladonia, there appears no good reason for Wainio's association of the two specifically. Even if *C. multiformis* is assumed to be the phylogenetic precursor of *C. furcata*, and a sequence of metamorphosis is to be found, the term *furcata* is a misnomer in its application to the scyphiferous prototype and a new name is in order. But evidence for such paternity for *C. furcata* is yet lacking. Both species are found in Knox Co., Maine. *C. furcata racemosa* abundantly and in all its forms as recognized by Wainio, *C. multiformis* sparingly. The former grows almost uniformly in colonies, while the latter is usually found solitary or in isolated small clumps. No *C. multiformis* has yet been found growing with *C. furcata racemosa*, nor has the latter been found in any quantity where the former abounds. *C. multiformis* is a shade loving plant, and is scarcely found in any other situation, while *C. furcata racemosa* will obtain a footing under less favorable, and even adverse conditions.

Having specified the points of dissimilarity which serve to distinguish *C. multiformis* from *C. furcata*, a similar severance is undertaken for its alleged relationship to *C. crispata*. The variability of *C. multiformis* has been foreshadowed in the preceding lines. So extreme is this diverseness that beside the erroneous reference of the form to a. *crispata* by Tuckerman and others generally, certain of its conditions have been named *C. gracilis*, *C. squamosa*, *C. crispata infundibulifera* and *C. furcata paradoxa* by good American authorities. Although inaccurately identified, any reference of the plant to *C. crispata* may be condoned, for in its various modifications so closely does it simulate some of the *crispata* subdivisions as recognized by Wainio, that only one well acquainted with the diagnostic factors for separation may avoid error. Thus the fissured conditions of *C. multiformis* are not unlike *C. crispata* f. *schistopoda* Wain., the folioliferous m. *divulsa* (Del.) Arn., and the f. *virgata* (Ach.) Wain. finds an imitator in some dark colored scyphiferous states. But all the varying exhibits on examination in an extended series resolve themselves into mere records of development, and the primal characters for the species are obvious throughout. The brief and inadequate description of *Baeomyces turbinatus* v. *crispatus* in the Acharian Methodus might be made to apply to *C. multiformis* equally with *C. crispata*, but in his Synopsis that author gives an amplified diagnosis that clears up the question of what is being described. Further confirmation of this may be derived from a statement of the Abbe Coemans in his "Cladonia Achariana." He says under the head of *C. crispata* that "all specimens of the Acharian herbarium are perfectly typical, and exhibit no approach to any other species." Perhaps the best method of pointing out the differences between *C. multiformis* and *C. crispata* is the parallel column. The form of *C. crispata* described is *infundibulifera* (Schaer.) Wain., for that seems to be the historical type, and is the condition of the species associated with *C. multiformis* under the name of a. *crispata* in the Tuckerman herbarium.

CLADONIA MULTIFORMIS.

Primary thallus commonly evanescent, but when observed, consisting of digitate, crenate or sinuous. small or medium sized squamules, growing compacted or diffused.

Podetia irregularly sub-cylindrical at the base, commonly entire but *sometimes fissured and gaping*, slender or stout, simple or *pseudo-branched by obliteration of an early scyphus*, esquamulose or more or less leafy throughout, the cortex continuous or areolate, glaucescent, whitish-glaucescent, olivaceous, greenish, fuscous or dark brown, scyphiferous, the cups closed by a *membrane*, or rarely minutely perforated, 2-25 mm. in width, narrowed or abruptly dilated, regular and the disk nearly uniform when small, but often oblique as the plant ages, *old and ex-planate scyphi often becoming sulcate, cribellate and lacerate* between the centre and margin, the margins dentate, or radiately or erectly proliferous, with cylindrical prolongations terminating in a cup, not uncommonly followed by from one to five more ranks, *or the secondary cup obsolete, when one, more or all of the proliferations may become branched*, these erect, divergent or recurved, subcylindrical or compressed, sulcate fissured and gaping, the summits furcate.

Apothecia short-pedicellate on the margins of the cups, or terminal on the extremities of the ramuli in branched states, immarginate, convex or subglobose, *and often perforated at the centre*.

The contents of the hymeneum for both species offer no points of difference. Italics mark the distinctive features of *C. multiformis*.

The scyphi of *C. crispata* are *infundibuliform* or rarely closed, those of *C. multiformis* typically *closed* or rarely perforated. This distinction while not infallible is of first importance in identification.

CLADONIA CRISPATA INFUNDIBULIFERA.

Primary thallus persistent or at length evanescent, of commonly medium sized ascendant squamules, these digitate lacinate, but the divisions mostly difform, growing compacted or diffused.

Podetia irregularly sub-cylindrical, commonly uniform, slender or stout, simple or branched, erect, esquamulose or leafy at the base, the cortex continuous or areolate, glaucescent or whitish-glaucescent, olivaceous or variegated, scyphiferous, the cups perforated and funnel-shaped, 3-6 mm. in width, commonly abruptly dilated, regular or at length oblique, the margin dentate, or radiately and simply or at length repeatedly proliferous, each proliferation commonly terminating in a cup.

Apothecia seated on the margins of the cups, sub-pedicellate, irregularly dispersed or aggregate.

*C. multiformis* so far as is ascertainable seems to be an exclusively American form, unless two Scottish plants described by Stirton and alluded to by Wainio Mon. II, p. 454 may be related. The second of these *C. arborea* Stirt. Not. Brit. Clad. (1885) p. 4 according to the description, is not unlike certain states of *C. multiformis*, but Stirton remarks that the cups were all perforated. This seems to imply a relationship to *C. crispata*, and it is under this caption that Wainio records it. A specimen contained in the Tuckerman collection communicated by Sprengel, marked "ex. herb. Delise" clearly with the present, is labelled *Cenomyce Novae Angliae Delise*, but on testimony of both Nylander and Wainio that name was also applied by Delise to *C. crispata infundibulifera* hence is untenable for the form here discussed.

*C. multiformis* is found according to data accompanying specimens communicated to the writer on dead wood, humus, thin earth over rocks and among mosses. In Knox Co., Maine, it is found in grassy tufts in old pastures and sparingly with densely growing *C. gracilis elongata*. It has been examined from Lake Nipigon, Ont., Montmorency River, Que., The Gaspé Peninsular, Fraser Falls, Que., and the Klondike region, collected by Prof. J. Macoun. Chilson Lake, N. Y., Mrs. C. W. Harris; Lake Winnepeaukee, N. H., Mrs. L. A. Carter; Sudbury, Mass., Miss C. M. Carr; Swan River Valley, Mont., Mr. T. A. Bonser; Pea Cove, Me., Mr. F. D. Merrill; Waltham, Mass., Mr. W. Gerritson; Guilford, N. H., Mrs. N. Smith, and Flag Island, Minn., Dr. B. Fink. The plant has been personally collected in various localities in Knox County, Maine, and in the White Mountains of New Hampshire.

Rockland, Maine.

### ALECTORIA TORTUOSA SP. NOV.

Thallus pendulous, elongated (30-40 cent.), lax, complicate, greenish-yellow, greenish-olivaceous or greenish-fuscescent; the comparatively thickened major branches unevenly terete, terete-compressed or sometimes angulate the minor ones modified similarly and filiform; rather remotely divided, the branching patent, axils compressed, webbed, and commonly somewhat lacunose, both major and minor branches more or less spirally elevated-white-striate; cortex smooth and sub-opaque. Apothecia not seen.

Anatomically the plant agrees in all its details with that of other *Alectoria* species. The characteristic cottony axis and filamentous cortical layer are identical with the similar elements of *Alectoria sarmentosa* Ach., which is indeed its nearest congener. The color of the thallus may be likened to that of the darker greenish states of *Evernia vulpina*, and in common with that species it communicates a little of its color to white blotters when wetted. The reaction is similar to that of *Alectoria Fremontii* Tuck., *A jubata proluxa* Ach. and *A jubata stricta* Ach. being KHO+fuscescent. Comparable with *A. virens* Tayl. in coloration, it differs in all other particulars. The peculiar twisted appearance of the cortical layer is found on splitting one of the branches to be structural, the torsion affecting all the layers. The extent of the twist is observed to equal six complete turns to the inch in one